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The Uniqueness of Short-Term Collateralization

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A secured letter-of-credit loan allows a lender to make larger loans than would be permissible on an unsecured basis, maximizing a risky borrower's investment capital. Empirical evidence shows that secured letters of credit are used by borrowers who are informationally opaque and have higher observable risk. Such borrowers also have fewer growth opportunities and are less likely to pay dividends.



Summary findings

Klapper finds evidence that lines of credit secured by accounts receivable are associated with business borrowers with a high risk of default. While an unsecured short-term loan is repaid from the borrower's future cash flow, a loan secured by accounts receivable (a unique form of "inside" collateral) is repaid from previously generated and observed sales (the borrower's trade credit terms to its customers). Consequently, lenders that secure accounts receivable are most concerned with the credit risk of the borrower's customers and the borrower's ability to continue to generate new sales.

A stylized theoretical model demonstrates that the value of a secured line-of-credit loan in minimizing

contracting costs is associated with the borrower's business risk and the quality of the borrower's customers. Empirical tests on a sample of publicly traded U.S. manufacturing firms find that firms with secured line of credit loans are observably riskier and have fewer expected growth opportunities.

Klapper's findings suggest that observably riskier borrowers can borrow more on a secured than on an unsecured basis. The results highlight the important role of secured letters of credit in providing liquidity to risky, credit-constrained firms that might not have access to external financing through other channels.

This paper—a product of Finance, Development Research Group—is part of a larger effort in the group to study financing for small and medium-size enterprises. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Agnes Yaptenco, room MC3-446, telephone 202-473-1823, fax 202-522-1155, email address ayaptenco@worldbank.org. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at lkapper@worldbank.org. February 2001. (37 pages)

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1. Introduction

Collateral has attracted an increasing amount of attention as an important feature in debt contracting.² Academic interest in collateral is not surprising, given its widespread use as an element in commercial loan contracting. In previous literature, Berger and Udell (1995) found that over 70% of loans to small businesses are collateralized. One type of secured debt contract that has not received enough attention in the literature is the secured line of credit (L/C), which provides commercial loans secured by short-term assets, such as accounts receivable and inventory. The use of collateral in L/C loans is particularly interesting because of the important role that L/Cs play in financing small and mid-size companies. These companies often obtain critical working capital financing under a forward contract (L/C) rather than in the spot market in order to reduce transaction costs and to obtain insurance against credit rationing.

Unlike other types of financing that are routinely collateralized, L/C loans may be extended as either secured or unsecured. This choice, however, is not well understood. Moreover, there has been a striking increase in the amount of loans outstanding under secured L/Cs. For example, the market for loans under secured commercial L/Cs increased over 100% during the 1990s, accounting for approximately 23% of the total amount of Commercial and Industrial (C&I) loans at US commercial banks in 1998.³

Despite the increase in this form of financing, most of the extant theoretical literature on collateral is quite general in nature and not specifically applicable to the distinctive nature of L/C loans. The process of secured lending is distinctly different

² For example, Barclay and Smith (1997), John et. al., (2000), Rajan and Winton (1995), and Triantis (2000).

³ Secured lending amounts are from the Commercial Finance Association Annual Report, 1999, and the C&I loan amount is from the Council of Economic Advisers Annual Report, 1999.

from unsecured lending. Whereas unsecured lending depends on credit worthiness and risk of borrower default, secured loans are principally based on the liquidation value of the borrower's asset base. What makes the secured L/C loan unique is that it is collateralized by assets whose ex-ante value is a random variable – unlike fixed assets whose depreciation rate and future liquidation value is known ex-ante, the value of inventory and accounts receivable depends on whether or not the borrower sells his inventory and collects his accounts receivable. In addition, the creditor guarantees receipt of the firms incoming cash-flow from the sale of inventory and the collection of accounts receivable via a lockbox or real-time monitoring.

Our model differs from previous work in our more detailed description of the moral hazard problems that are specific to the liquidation of short-term assets. Hart and Moore (1989) show that debt contracts can be written to the extent that investors can liquidate the borrower's assets in the case of default. Under their conditions, debt contracts cannot be written against expected cash flow since cash has no value as collateral in case of default because it is “divertable”. This is defined as the ability of management to divert cash funds to non-optimal investments or personal gain. Accounts receivable, which represent past revenue owed to the firm (the value of the firm's extended trade credit), also represent the firm's short-term expected cash flow. Because the cash realized from the collection of accounts receivable can be diverted without verification, it is difficult to write a debt contract against accounts receivable. Our model derives collateralization of short-term assets as a costly monitoring mechanism that ensures that cash collection goes to the lender without the possibility of diversion and allows a debt contract collateralized by short-term assets to be sustainable.

The model addresses the problem of cash diversion by allowing a lender to secure, for a cost, a borrower's accounts receivable explicitly, giving the lender *dominion* over ex-ante unrealized cash flow to the borrower. The lender either permits the borrower to collect the accounts and remit the proceeds to the lender or the lender takes possession of the borrower's incoming cashflow directly via a lockbox or by notifying debtors that their account has been "assigned" to and payable only to the lender. This type of lending is costly because the lender closely monitors the creation and collection of collateralized accounts receivable.

Our theoretical results are confirmed by empirical tests on the use of secured L/C loans by a sample of firms. Our sample improves upon previous empirical work, like that of Berger and Udell (1995), because we have been able to identify the use of secured L/Cs by *publicly traded* companies. The use of secured L/Cs by small firms is not surprising since these firms are most likely to be informationally opaque and have fewer external choices of financing (as found in Gertler and Gilchrist (1993)). However, the choice of secured L/Cs by mid-sized, publicly traded firms with a wider menu of financing is not as obvious. Analysis of our sample addresses the different, unanswered question of why public firms would collateralize their short-term assets and absorb the related monitoring costs.

Using a sample of public companies also allows us to test the predictions of previous literature finding a connection between a borrower's choice of financing and future growth opportunities. This sample of firms allows an examination of the link between the use of secured short-term debt and the market value of the firm, which provides important information about the market's perception of the borrower's risk. Our

empirical tests find significant evidence that firms using secured L/Cs are not only observably riskier but are also perceived by the market to have fewer growth opportunities. These findings suggest that a firm's ability to borrow on an unsecured basis depends on both observed past performance and expected future success.

The paper proceeds as follows: Section 2 examines previous theoretical and empirical literature discussing the relationship of collateral, liquidity and risk. Section 3 discusses the model and motivates the testable hypothesis. Section 4 presents the empirical results, which find that firms that include secured L/Cs in their corporate structure have higher risk, less liquidity and fewer growth opportunities. Section 5 concludes.

2. Previous Literature

With few exceptions, most extant literature on collateral is theoretical in nature and focuses on the role of “outside” collateral, defined as *personal* assets pledged by the borrower (for example, the borrower’s house) not otherwise collectable by other creditors of the firm.⁴ Since outside collateral is a substitute for an equity contribution by the borrower, in general, the discussion of outside collateral is only applicable to privately held companies. Alternatively to outside collateral, a firm may pledge “inside” collateral, which are assets that comprise the liquidation value of the firm. Unlike outside collateral, inside collateral provides benefits to secured lenders at the expense of unsecured lenders – pledging inside collateral to one lender effectively subordinates the debt of other lenders.

⁴ An exception is the empirical study by Avery et al., 1998).

Our paper addresses the previously unanswered question as to why mid-sized companies might prefer to use inside collateral.

One theory regarding the appeal of collateral is the “signaling hypothesis” that suggests that borrowers pledge collateral to signal to creditors their low risk and high profitability. Bester (1985) predicts that high-quality firms secure with outside collateral a greater portion of their debt than low-quality firms do, in order to address the ex-ante information asymmetry of the proposed payoff distribution of the loan at the time the debt is issued. Since using collateral is expensive, only high-quality firms can afford the supplemental fee without increasing their risk of default. Additionally, Townsend (1979) demonstrates theoretically that high-quality firms secure a greater portion of their debt than do low-quality firms in order to signal to the market their credit-worthiness.

In practice, however, it appears that observably *riskier* firms pledge collateral (Berger and Udell (1990)). Many firms find that they lack the credit standards to qualify for unsecured short-term bank credit and that they can borrow only if they offer some type of collateral to protect the lender in the case of default. Rather than offer an alternative higher rate, many lenders, in particular finance companies (non-depository lenders), demand that risky borrowers pledge collateral to support their loans. Some papers explain this by appealing to an “agency” (moral hazard) argument. This theory argues that collateral is not voluntarily supplied by borrowers to signal a high quality; rather, collateral is offered to lenders to protect them from the possible consequences of the ex-post decisions of borrowers between the time the debt is issued and the loan’s maturity.

Stulz and Johnson (1985) show that a leveraged firm may undertake some new profitable projects with secured debt that it might not otherwise undertake if new equity or unsecured debt were required. They discuss the case of a firm with outstanding debt ("debt overhang") facing financing constraints for positive NPV projects. In this case stockholders will not invest because the expected payoff is too low and debtholders will not invest because the borrower cannot guarantee positive returns. The authors find that securing a loan allows a borrower to guarantee positive return to the debtholder in both the bad and good state and to secure financing. They argue that the greater the underinvestment problem posed by Myers (1977) the more likely that the firm will issue secured debt.

Additional literature on outside collateral includes Boot, Thakor, and Udell (1991), who derive conditions under which shareholders would pledge outside collateral. Their paper finds that shareholders pledge personal assets as collateral to resolve the problem of asymmetric information about the true value of the firm. They assume that borrowers/shareholders have informational advantages over lenders about the true quality of the firm. Given these assumptions, they find that private information causes a positive relationship between the pledging of collateral and borrower risk.

Previous theoretical literature on inside collateral includes Berger and Udell (1990), who find evidence that observably riskier borrowers are required to pledge firm assets. In addition, Swary and Udell (1988) find that in the case of information asymmetry between the borrower and the lender, pledging inside collateral encourages optimal firm liquidation. Their paper finds that riskier and more highly leveraged firms,

which have a higher probability of default and liquidation, are more likely to use secured debt.

The consensus in previous literature on collateral is that lenders use secured debt contracts to address agency and moral hazard problems. Our model, however, differs from previous work by specifically linking moral hazard to the liquidation of short-term assets. This model determines the conditions under which inside collateral is an optimal feature for a debt contract to address the agency and moral hazard problems associated with short-term debt.

3. The Model

“I don’t lend against assets. I lend against collateral.”

- Walter Heller, Founder, Heller Financial.

Hart and Moore (1994) argue that short-term assets, such as accounts receivable and inventory, should support an optimal short-term working capital (inventory) loan. This result is supported by Fluck (1997), who finds that an optimal debt contract features matched maturity of the debt contract and the borrower’s assets (or collateral). Missing from their discussion, however, is a distinction between the moral hazards specific to the liquidation value of a firm’s investment in long-term *fixed* assets (such as equipment) and short-term *variable* assets (such as accounts receivable).

In previous literature, the value of a firm’s fixed assets at any point in the future life of a loan is modeled as the deterministic, ex-ante depreciation rate of the fixed assets, which is known by the borrower and the lender with certainty. However, accounts receivable and inventory are arguably special types of collateral since the expected value

of the future cash flow that these assets will generate are *random* variables determined by the firm's future sales and collected cash flow. Accounts receivable are generated by the sale of inventory, when the firm's customers are offered trade credit. The expected value of accounts receivable depends on the probability that the firm's accounts receivable will be collected from the firm's customers. Therefore, the expected return of the investment in inventory depends on both the business risk of the firm (the probability that the inventory will be sold) and its customers (the probability that the accounts receivable will be collected).

Within the framework of the Hart and Moore (1989) model, the borrower can costlessly divert cash flow to personal perks. Therefore, it is costly for lenders to write a loan contract based on working capital itself because the collection of accounts receivable, which is the source of repayment, represents their transformation into cash which is divertable without verification. Our model discusses an optimal security design for debt contracts written against a borrower's short-term assets by introducing the ability of the lender to secure the cash proceeds of the borrower's accounts receivable for a cost of ω .⁵ If the borrower pledges his short-term assets to a lender, then the borrower is prevented from diverting future cash flow for his personal wealth to the extent that it impairs the repayment of the loan.

A lender who secures his debt with inventory and accounts receivable is legally entitled to both the liquidation value of the borrower's assets in the case of default and to

⁵ The cost ω is not a random monitoring or auditing cost, (as in Townsend (1979)), but rather the cost of legally assigning cash flows directly to the lender. This cost includes, but is not limited to, the cost of monitoring the borrower's collateral position in a real-time basis and exercising control over the borrower's accounts receivable (using a lockbox, for example.)

dominion over the transformation of these assets into cash.⁶ In addition, a lender who takes short-term assets as collateral has a priority claim that extends beyond just the existing current assets of the borrower; the law allows for a “blanket lien”, which is a continuing, “floating” security interest in all present and *future* current assets of the borrower. Thus, a lien on current assets gives a lender a claim against all current and future inventory, current accounts receivable and future accounts receivable generated from the sale of current and future inventory, and all future cash collected from those accounts receivable. Whereas an unsecured lender is unable to verify diversion by the borrower, a secured lender has the legal right to monitor and supervise cash collection and prevent diversion. By securing the borrower’s accounts receivable, the lender can implement a monitoring technology that legally and physically prevents the borrower from diverting cash when the accounts receivable are collected.

Our model is restricted to those firms whose only means of securing short-term debt contracts is with the collateralization of short-term assets (such as accounts receivable and inventory.) We assume for purposes of illustration that the firm has no fixed assets to liquidate in the case of default. This supposition adds simplicity without a loss of generality and is a reasonable assumption. For example, this describes many small and medium sized borrowers who lease their equipment and do not own any property. The model also applies to borrowers who have pledged their fixed assets to other lenders (a mortgage lender, for example). In this case, the lender is not legally entitled to the liquidation value of the borrower’s fixed assets in the case of default. This

⁶ A standard secured lien of short-term assets includes the clause, “Inventory including proceeds and products; account(s) including proceeds and products”.

assumption also applies to technology firms, which have no tangible assets and are a growing segment of asset-based lending.⁷

A brief summary of the borrower's decision is as follows: In period 0, the firm is endowed only with accounts receivable, AR_0 , that were generated from an investment in inventory in a previous period.⁸ In period 0, the borrower has an option to continue the game into the next round by re-investing in inventory. We assume that the borrower's wealth is limited, such that any investment in inventory must be debt-financed either on a secured or unsecured basis. The availability of financing will determine the extent to which the borrower takes advantage of the option. Therefore, in general, the choice of secured versus unsecured debt will turn on which provides more credit availability.

The features of our two period model are as follows: In period 0, the firm begins with an initial endowment of accounts receivable with an invoice amount of AR_0 and an expected cash value of $E[R_0]$, which were generated with inventory purchased before period 0.⁹ This model requires that the firm began operating and generating sales before period 0, which is a necessary condition in order to discuss debt contracts secured by *inside* collateral.¹⁰ In period 0, the borrower has an option to purchase new inventory, IN_0 . This can only be financed with a loan equal to L ($IN_0=L$). Thus, the extent to which the firm takes advantage of this option depends directly on how much the bank will lend. Therefore, in our model IN_0 is endogenously determined by the value of L and the

⁷ The growth of receivable loans to technology companies is evidenced by the emergence in 1997 of three bank subsidiaries that target emerging and growing technology companies for secured L/Cs.

⁸ We assume that this inventory was purchased with an earlier endowment of wealth.

⁹ This model is differentiable from Aghion and Bolton (1992) who assume that a borrower has no initial wealth.

¹⁰ Sources of credit in period $t-1$ include credit cards, private equity, and loans secured by personal assets ("outside" collateral).

borrower maximizes his wealth by maximizing his profitability, which, in turn, is maximized by maximizing his investment in inventory.¹¹

In period 0, the borrower decides whether or not to continue his firm for another period by re-investing in inventory. The borrower will only borrow L to purchase new inventory if the investment has a positive net present value (NPV); that is, the return on the investment in inventory must be greater than one. This depends on the probability that the inventory will be sold, θ , the profit margin on that sale, γ , and the probability that the accounts receivable will be collected, δ . Thus, we measure the return on inventory to be the productivity of inventory times the probability that the inventory will be realized as collected cash: $\gamma\delta\theta(IN_0) > 1$.

The borrower's business quality is measured by θ , where a low θ predicts that the borrower will be less likely to sell his inventory. If the firm sells its inventory (IN_0) at a markup of γ , it will generate new accounts receivable of AR_1 , which have an expected cash value equal to $E[R_1]$. Since IN_0 is endogenously determined by the value of the loan, L , we can express AR_1 as γL . However, with probability $(1-\theta)$, the firm is unable to sell its inventory and new accounts receivable equals 0. Without a loss of generality, we assume that the borrower's inventory is perishable and has a liquidation value of 0 in period 1.¹² This measure of the firm's quality, θ , is observed by both the borrower and the lender.

The parameter δ is the probability (on both period 0 and period 1 accounts receivable) that the firm's customers will default and that trade credit will not be

¹¹ We assume that the borrower is risk neutral and has no utility or time preferences.

¹² Allowing inventory to have a positive liquidation value in period 1 strengthens the model's findings.

collected.¹³ The value of δ varies by firm with the quality and diversity of the borrower's customers. With probability δ , the firm collects its accounts receivable and cash equals AR_0 (or AR_1). With probability $(1-\delta)$, the firm's customers default and cash equals 0. Both the lender and the borrower know the value of δ in period 0.

In summary, the time line for the borrower is as follows:

T=0	T=1	T=2
<u>ASSETS:</u>		
Accounts receivable = AR_0	Old Accounts Receivable, AR_0 , generates Cash = R_0 with probability δ	
Inventory = $IN_0 (=L)$	Inventory, IN_0 , generates New Accounts Receivable = $AR_1 (= \gamma L)$ with probability θ	New Accounts Receivable, AR_1 , generates Cash = $R_1 (= \gamma L)$ with probability δ
<u>LIABILITIES:</u>		
Firm borrows $L = IN_0$ to purchase Inventory	Firm owes lender R_0	

In period 1, the borrower decides whether to repay the loan to the lender or divert cash from period 1 accounts receivable, R_0 , to himself. In order for the firm to continue, the borrower must repay the loan, L , to the lender in order to continue borrowing to purchase new inventory. If the borrower's inventory is sold and accounts receivable are collected (with probability $\theta\delta$) then the borrower will always re-pay his loan and continue

¹³ The value of δAR is approximately equal to the accounting methodology of AR less Reserve for Bad Debt.

the firm.¹⁴ If the firm does not collect its period 0 accounts receivable outstanding, then the firm does not have any cash for the borrower to divert. However, if the borrower collects his accounts receivable but fails to sell his inventory (with probability $(1-\theta)\delta$) he will divert the cash flow to himself, since the lender will liquidate the firm.

In addition, there are additional costs to the borrower for a secured loan, equal to $(1+\omega)$. In period 0, the value of the unsecured loan, L , and the value of the secured loan, L^* , are determined. Lenders will only make a loan if the borrower has verifiable assets that can be liquidated at the time of maturity. (In order to guarantee themselves repayment in the case that the borrower defaults). The maximum amount of the secured loan, L^* , versus the maximum amount of the unsecured loan, L , available to the firm depends, among other things, on the assets of the firm in period 1 when the loan becomes due.

The lender in this model has no incentive to renegotiate the loan in period 1 since the liquidation value of the collateral does not appreciate with an additional period. In general, a lender will renegotiate a loan if the value of the firms is greater in operation than its salvage value. The value of accounts receivable, however, depends on the creditworthiness of the debtor and is independent of the continuation of the firm. Consequently, in the model the expected cash flow from the borrower's accounts receivable AR_1 is *independent* of the continuation of the firm past period 1. In other words, since the liquidation of the firm, whose expected value is $E[R_1]$, is realized in period 2 with or without the continuation of the firm, *the lender has no incentive to renegotiate with the borrower.*

¹⁴ The condition under which the borrower initially invested in inventory in period 0, (when $\gamma\theta\delta(IN_0)>1$) ensures that the borrower in our model will never consume if he can re-invest in inventory. In addition, in

The return on the lender's investment depends on the business quality of the firm, θ , and the credit worthiness of the firm's customers, δ . For example, if the firm sells its inventory with probability θ and collects its outstanding accounts receivable with probability δ , then the lender can be repaid a maximum of R_0 , the amount of accounts receivable outstanding in period 0. The lender receives this amount regardless of whether the loan is secured or unsecured. However, if the firm sells its inventory but fails to collect its outstanding accounts receivable, then the firm defaults on its loan since it has no cash with which to repay the lender. In this case, the lender collects the expected liquidation value of the borrower's accounts receivable, AR_1 , equal to γL^* with probability δ – regardless of whether the loan is secured.

The secured loan, however, is distinguished from the unsecured loan in the case where the firm fails to sell its inventory but collects its outstanding accounts receivable. In this case, which occurs with probability $(1-\theta)\delta$, because the firm did not sell its inventory (and did not generate new accounts receivable), it has no expected cash flow and is unable to continue. Therefore, it is optimal for the borrower to divert the collected cash R_0 to himself and the lender receives zero. However, a *secured* lender has dominion over cash flow to the borrower (that prevents diversion), so as long as the firm collects its accounts receivable (with probability δ) the lender receives cash flow R_0 . In this case, even if the firm does not sell its inventory (with probability $(1-\theta)$), the borrower is unable to divert period 1 cash flow.

Proposition 1: *The borrower will always be able to borrow more on a secured than on an unsecured basis.*

liquidation the borrower would lose the expected cash flow from the successful sale of period 0 inventory.

For illustrative purposes, Figure 1 plots the values of a secured and unsecured loan for varying values of firm quality, θ , and shows that a borrower will always be able to borrow more on a secured than on an unsecured basis.¹⁵ The lender is willing to lend more to a borrower on a secured basis because the lender is protected against the borrower's diversion of cash flow. This result is important because it reveals why this type of financing is attractive, in spite of its higher cost. An exception to this proposition is when $\theta = 1$, which is the case that the borrower has zero risk of default. Since the borrower will never have incentive to divert, he can borrow as much on an unsecured as on a secured basis.

Corollary 1: As business quality increases, the gap between L^* and L becomes smaller.

Figure 1 also shows that as the quality of the firm decreases (θ becomes smaller), the amount that the borrower can borrow on a secured basis, relative to an unsecured basis, increases. As the probability that the firm will not sell its inventory increases, the probability that the borrower will have incentive to divert cash flow to himself increases, and the marginal benefit to the lender of a secured the loan increases.

The choice between borrowing on a secured versus an unsecured basis depends on the benefit of increased investment capital versus the cost of secured financing. The only state in which a borrower with a secured loan receives a positive return is in the case that he collects his accounts receivable and sells his inventory. In addition to losing the ability to divert cash to himself, the borrower also incurs the variable cost of secured debt equal to $\omega_0 L^*$.¹⁶

¹⁵ We assume realistic values of $\delta=0.97$ and $\gamma=2$.

3.1 Discussion of the Model

The results of our model are consistent with the conventional wisdom that lenders collateralize L/C loans to secure themselves *dominion* over the collection of the borrower's collected cash and to determine ex-ante the distribution payoff of the borrower's assets in the case of default. Our model finds that in general collateralization is an optimal contract to address the agency problems associated with short-term debt when the liquidation value of the borrower's assets at the time of the loan's maturity equals zero (as is the case with accounts receivable).

Our model finds that in the case that the borrower defaults on his loan (when the borrower does not collect accounts receivable or diverts cash flow to himself) the liquidation value of the firm depends on the risk of the firm, θ . (The liquidation value of the firm is equal to the expected value of accounts receivable generated from investment IN_0). Since θ is known to both the lender and the borrower, there is the possibility that borrowers with an observably high risk of default will underinvest in positive NPV projects. We suggest that high-risk borrowers can maximize the value of their loan by offering the lender a guaranteed liquidation value in the case of default.

The multi-period feature of a secured L/C loan reduces a borrower's short-term liquidity risk and transaction costs by eliminating the need for the borrower to renew his short-term debt each period when his previous debt matures. The L/C loan contract offers a mechanism that permits a lender to offer a multi-period loan against the expected cash flow to the firm, by allowing the lender to secure as collateral a "*floating*" security

¹⁶ The model's predictions are also consistent for fixed costs of secured debt.

interest in the borrower's present and *future* accounts receivable.¹⁷ In general, the lender will loan a collateral margin of the borrowing base and the loan is repaid as the borrower's accounts receivable are collected.¹⁸

In addition, multi-period L/C loan contracts often do not include restrictive covenants (such as compensating balances) since a secured lender has the right to revoke the L/C if the loan is not repaid (if the borrower defaults) or if the borrower fails to generate new accounts receivable to act as collateral. This provides the lender with information not only about the value of the collateral, but also about the firm's solvency and overall performance. This information includes real-time sales, account receivable and inventory turnover, customer quality, returned items, and product quality. This extensive information about the borrower's short-term assets and liabilities gives the lender an early warning of deterioration of the quality of the borrower's performance. A secured L/C loan offers the borrower the advantages of long-term debt while providing the lender an *uncontingent* right to withdraw the loan, even in the case that the borrower does not default.

In addition, the return to the lender on a secured L/C does not depend on the credit risk of the borrower. For this reason, receivable loans are often used for financial restructuring. A borrower's current lender may demand to be repaid if the borrower is underperforming, if the borrower is highly leveraged, or because of "lender fatigue" (for example, if the lender decides to call in all loans in a specific sector or industry). However, if the borrower has accounts receivable on his balance sheet, he may turn to a secured lender as a "lender of last resort". As stated by a secured lender at Congress

¹⁷ The standard clause in the UCC secured lien filing lists as collateral: "Accounts receivable including proceeds and products".

Financial, “They were one step away from Chapter 11. The two things we were able to offer them was time and liquidity.”¹⁹ An attractive feature to credit-constrained borrowers is that lenders will often quickly lend capital based on the creditworthiness of the borrower’s collateral, without performing lengthy credit evaluation of the borrower. This suggests that higher-risk firms are more likely to use secured debt.

In previous literature, Jensen and Meckling (1976) argued that collateral can be used by lenders to control for the agency problem of asset substitution (borrowers substituting riskier for less risky assets). Since a firm is legally prohibited from selling an asset secured with a lien, an asset pledged as collateral is not marketable and cannot be replaced with a riskier asset. Lenders may therefore secure a borrower’s assets to address the incentive of managers of highly leveraged firms to increase the riskiness of their business (and the likelihood of default). This suggests an additional objective unique to receivable loans: Since accounts receivable are equal to future cash flow, their use as collateral can maximally restrain management from diverting future collected cash (the return on the lender’s investment) into personal perks, such as salaries and expenses. By securing a borrower’s accounts receivable, a lender can limit managerial discretion over cash.

4. Empirical Analysis

Collateral is an attractive debt-contracting feature because it gives the lender a legal priority to the full liquidation value of the collateral in the case of default. In previous literature, Scott (1986), Leeth and Scott (1991), and Triantis (1994) find that secured debt

¹⁸ This is equivalent to the “slowest repayment path” in the Hart and Moore (1989) model.

alleviates the costs of bankruptcy and can be used to the greatest advantage by a firm with the highest risk of default. They argue that the use of collateral reduces foreclosure costs (such as court and lawyer fees) by determining ex-ante the distribution of the liquidation value of the borrower's assets in the case of bankruptcy. Their findings suggest that firms with higher liquidation values (relative to asset value) would be more likely to use secured debt. For example, firms with highly specialized assets would be less likely to collateralize.

There is scarce previous literature that tests empirically the use of secured debt. Titman and Wessels (1988) support previous theoretical claims that firms with unique or specialized products have relatively low debt ratios. They argue that small and medium sized firms are more likely to collateralize, since very large firms may be too expensive and complex to liquidate and therefore consequently their collateral is not as valuable. Berger and Udell (1990) find that secured loans have a greater likelihood of default. By implication, they conclude that secured borrowers must be riskier than unsecured borrowers.

Berger and Udell (1995) test the use of secured L/C loans by a sample of small firms of which nearly all of the firms are privately owned and asset size ranges up to only \$219 million. They find evidence that both risk and information asymmetries determine a firm's use of secured debt. They find that the probability of pledging collateral is significantly related to the age of the firm and the length of the firm's banking relationship (two signs of information opaqueness) and the firm's leverage ratios (measures of firm risk). However, this is not surprising given the limited external

¹⁹ "Ailing Retailers Get Breathing Room as Asset-Backed Loans Gain Acceptance", *Wall Street Journal*, June 20, 1997.

financing options of small firms. Our empirical tests address the broader question of the choice of public companies, with alternative financing venues (such as equity and public debt) to use secured L/Cs.

4.1 Data Description

A sample was randomly drawn of 850 publicly traded manufacturing firms that were listed in Compustat in 1996 and were traded between the years 1991 and 1996.²⁰ To identify firms with secured revolving L/C loans, we searched in LEXIS/NEXIS (a private legal information provider) for our sample firms for UCC liens outstanding against *accounts receivable*.²¹ The UCC lien includes the date of the filing, the debtor's name, the creditor's name, and a description of the collateral. The inclusion of this information allowed us to distinguish between loans secured by fixed and "floating" assets (such as accounts receivable). Firm-level data was collected from Compustat and CRSP.²²

4.2 Variable Descriptions

A. Size, Age, and Growth Variables

We find in previous literature that size and age significantly affect a firm's ability to obtain external financing. This result is also predicted in our model, which finds that more informationally opaque firms should be more likely to require collateral. Summary statistics of our sample support these findings: The median size of assets of firms without secured L/Cs is \$174.22 million while the median size of firms with secured L/Cs is only

²⁰ This represents 65% of all manufacturing firms listed in Compustat (SIC codes beginning with 2 or 3). Summary statistics for this subsample are significantly insignificant from the full sample.

²¹ In order to claim priority to a secured asset in the case of default, a lender must legally file in court a UCC lien against the asset(s). Consequently, we can ascertain that any outstanding liens would be included in Lexis/Nexis. In addition, SEC 10-K filings were checked to confirm that liens were not filed by a factor, an unpaid creditor, or for a securitization.

²² Financial ratios were corrected for outliers above and below 95% and 5%, respectively.

\$53.0 million (Table 1). Total sales for firms with and without secured short-term debt are \$68.48 million and \$209.32 million, respectively.

Gertler and Hubbard (1989) examine a cross-section of public and private manufacturing firms and find that the percentage of long-term debt received from banks declines with an increase in the size of the firm. They show that smaller firms are more credit-constrained and have less access to credit. In addition, they find that a firm's "collateralizable" net worth is a determinant of the amount and terms under which a firm can borrow. Our results find that firms exhibiting credit constraints are most likely to pledge collateral (to increase the size of their loans). This suggests that smaller firms would be more likely to have secured debt outstanding. Firm size is measured alternatively as the logged value of total assets, total sales, and number of employees, ASSETS, SLAES, and EMPLOYMENT, respectively, and is expected to be smaller for firms with secured accounts receivable.

In addition, the probability of a firm's failure decreases with age, which implies that a younger firm has a greater risk of default. However, our variable AGE, measured as the number of years publicly traded, does not account for changes in a firm's focus over time. For example, an older manufacturer (originally of typewriters, for example) who changed the nature of his business over time may have a risk of default similar to the risk of a young firm. To identify firms that have changed their business direction, our regression also includes the average of annual growth in the number of employees over five years, EMPLOYGR5. We suggest that a positive growth in employment signals that a firm is experiencing growth. Therefore, a growth in employment should indicate a younger firm and should be positive for borrowers with secured L/Cs.

B. Leverage and Liquidity Variables

Our model predicts that when a borrower's riskiness and probability of default increases, the likelihood that the lender will demand collateral increases. Lenders use liquidity ratios, which measures a firm's ability to meet short-term liabilities by converting illiquid short-term assets (such as accounts receivable and inventory) into cash, to measure a borrower's risk of default. Low liquidity ratios can prevent firms from borrowing from conventional cash flow lenders to finance positive NPV projects.

Carey et al. (1998) finds that finance companies, which, in general, specialize in secured receivable financing, have significantly riskier, more leveraged borrowers. Our regressions include liquidity ratios to test if risky firms that are unable to access alternative sources of credit use secured L/Cs. Accounts receivable (assuming standard payment terms within the range of 30-60 days) are the most liquid asset a business has, short of cash, since the lender can collect the proceeds without a third party. This differs from other assets, such as equipment, which must first be sold. Therefore, accounts receivable are the easiest asset for credit-constrained borrowers to use as a potential source of credit. Since the amount of a secured loan only depends on the borrower's past performance and ability to collect its accounts receivable, firms also turn to receivable lenders as a "lender of last resort" after violating traditional bank loan covenants, such as liquidity ratios.

The most common measure of liquidity is the current ratio, CURRAT, which is measured as current assets divided by current liabilities. This is a broad measure of short-term working capital. This measure assumes, however, that the borrower could liquidate its cash holdings, security investments, and inventory, in order to pay off its

creditors. A alternative measure of liquidity is the quick ratio, QUICKRAT, which is measured as current assets *less inventory* divided by current liabilities. This may more accurately reflect the inability of firms to liquidate their inventory during periods of distress. In addition, we include the market value of leverage, LEVERAGE. We expect that firms with secured accounts receivable will exhibit greater liquidity risk.

C. Turnover Variables

Short-term risk may also depend on a borrower's trade cycle, which is measured by the borrower's turnover ratio of current assets into cash. A slow conversion cycle indicates a greater risk of default. We use two turnover ratios: The accounts receivable turnover ratio, ACCPAYTURN, measured as accounts receivable divided by sales, suggests how long it takes a company to collect from its customers. The inventory turnover ratio, INVENTURN, measured as inventory divided by the cost of goods sold, indicates how quickly a company sells its inventory. We expect that firms with secured L/Cs should have relatively strong accounts receivable – since these firms need high-quality accounts receivable in order to receive financing, we expect a self-imposed discipline on the part of the borrower to restrict trade credit to high-quality customers. In contrast, we expect that firms using secured L/Cs should have greater business risk and slower inventory turnover.

D. Future Growth Variables

In previous literature, Opler et. al (1997) find that a firm's corporate financing decisions depend on various measures of the borrower's future growth opportunities, measured as the market-to-book ratio. Barclay and Smith (1995) use Compustat's breakdown of *long-term* debt priority classes to explain variation in priority structure.

They find evidence that firms identified as lower quality and having fewer growth opportunities have fewer financing choices and consequently a greater percentage of long-term debt is secured. However, their sample is limited to the collateralization of *fixed*, long-term assets, which do not feature the moral hazard problems discussed in our model. We extend their finding and test the relationship between short-term debt collateralization and future growth. We expect that the intuition in the previous literature also applies to firms short-term financing choices, and we expect to find that firms with less expected growth opportunities are more likely to use secured L/Cs.

One measure of potential future growth is the ratio of market-to-book value, MKTBK, which is the market's perception of growth opportunities. A second measure is (pseudo) Tobin's-q, TOBINQ, which is a measure of the market's assessment of a firm's investment opportunities.²³ A third measure is the ratio of research and development expenditures to sales, RDSAL, which predicts the development of future projects.²⁴ We expect that firms with fewer growth opportunities should be more likely to use secured L/Cs.

E. Dummy Variables

The first dummy identifies firms that paid dividends in 1995, D-DIVPAY. We expect firms with secured accounts receivable to be less likely to pay dividends. Stulz and Johnson (1985) suggest that secured borrowers would not pay dividends because collateral prevents asset substitution, discouraging borrowers from selling collateralized asset in order to pay dividends. If secured accounts receivable control the borrower's

²³ We test a (pseudo) Tobin's-q, which is approximated as the book value of debt plus the market value of equity divided by total assets.

access to cash, then it would reduce the ability of the borrower to pay dividends. In addition, this dummy tests if credit-constrained borrowers choose to reduce or eliminate dividends in order to provide additional liquidity.²⁵

A second dummy is included that equals 1 if the firm paid no dividend payments in 1995, but paid dividends at least once during 1901-1994, D-PREDIV. This tests whether firms reduce dividend payments during financial distress. Fama and French (1997) argue that firms do not reduce dividends to increase internal funds. Their paper refutes the “pecking order” theory, which suggests that there exists a hierarchy of financing options and that cheaper, internal financing is preferred to expensive, external financing. This dummy tests if indeed firms that are dependent on an expensive source of credit, such as secured L/Cs, maximize their internal sources of cash.

A third dummy is included for firms that have a bond rating, D-BNDRAT. A bond rating indicates an access to public markets, which offers an additional source of liquidity and reduces potential credit strains. It is expected that firms that have a bond rating are less likely to be dependent on secured debt.

4.3 Econometric Specifications and Results

To test whether firm characteristics determine the use of L/C loans secured by accounts receivable, we estimate using logit discrete choice models equations of the form²⁶:

²⁴ Opler et al. (1996) found that highly leveraged firms that performed badly had *higher* R&D divided by sales, since this indicates firm-specific assets that are more vulnerable to economic downturns. However, we find this ratio significantly negative for firms with secured debt outstanding.

²⁵ In addition, firms are only likely to offer dividends if they are confident of their future cash flows and ability to continue payments.

²⁶ Alternative specifications are shown in brackets.

$$\begin{aligned}
\text{SECLC} = & \alpha + \beta_1 \text{Ln(ASSETS)} \{ \text{Ln(SALES)}, \text{Ln (EMPLOYMENT)}, \text{AGE} \} \\
& + \beta_2 \text{EMPLOYGR5} \\
& + \beta_3 \text{CURRAT} \{ \text{QUICKRAT}, \text{LEVERAGE} \} \\
& + \beta_4 \text{INVENTURN} \{ \text{ACCRECTURN} \} \\
& + \beta_5 \text{MKTBK} \{ \text{RDSAL}, \text{TOBINQ} \} \\
& + \beta_6 \text{D-DIVPAY} + \beta_7 \text{D-PREDIV} + \beta_8 \text{D-BNDRAT} + \varepsilon_1
\end{aligned} \tag{1}$$

All of the variables shown in equation (1) are described in Table 1, except for the random error term ε_1 . Table 1 shows summary statistics for the variables tested in the model. Table 2 shows univariate tests of whether the means of secured and unsecured firms are significantly different from each other. The reported results show that secured borrowers have significantly smaller amounts of total assets, sales, and employment, and significantly slower employment growth. Secured borrowers show signs of being significantly liquidity constrained and slower to turn over their inventory. The market seems to perceive these firms as having fewer growth opportunities and as less likely to pay dividends. These financial indicators strongly suggest that smaller, less liquid firms, with lower predicted future growth are significantly more likely to use secured accounts receivable for financing.

Also included in the summary statistics is the Altman Z-Score, *ALTMANZ*, which is used as a predictor of bankruptcy and liquidation. The Z-Score combines five financial ratios, assigning each a different weight. It includes: net working capital, retained earnings, interest earned, market-to-book, and sales. A lower Z-Score suggests a higher likelihood that the business will go bankrupt in the following year. The median Z-Score for firms with secured short term debt is significantly larger than the Z-score for

firms without secured accounts receivable, which offers further evidence that lenders demand collateral to protect against a high risk of default.²⁷

Table 3 shows logit regression results. Columns (1)-(4) show that size is significantly negatively related to the use of secured L/C loans. This is consistent with our model's prediction that larger, less informationally opaque firms should be less likely to pledge collateral. This result is also robust to the substitution of $\text{Ln}(\text{ASSETS})$ with $\text{Ln}(\text{SALES})$ and $\text{Ln}(\text{EMPLOYMENT})$, not shown. AGE is not statistically significant, but as predicted, 5-year employment growth, EMPLOYGR5 is significantly positive in all regression specifications. An increase in employment signals that a firm is experiencing growth and may be either a new firm or an existing firm entering or expanding into a new line of business. Since it is difficult to determine the future earnings of a firm that is young or in transition and because growing firms often need to maximize their debt capacity, a firm with high employment growth may be credit constrained. This is consistent with our finding that a firm with higher employment growth is more likely to use secured L/Cs.

We evaluate the economic significance of firm size in our model by simulating the effect of doubling the size of the firm's asset size and calculating the change in the probability of using a secured L/C, starting from the subsample means for $P(\text{SECLC})$. We find that with a doubling of firm size, the probability of using a secured L/C decreases from 19.2% (as shown in Table 1) to 15.35%. This amounts to an economically significant 20% decrease in the probability of using a secured L/C loan.

²⁷ The Altman Z-Score is not used in the regression since it is highly correlated with other variables being tested.

Additionally we find that a doubling of firm employment growth increases the likelihood of using a secured L/C loan by almost 40%.

As shown in Table 3, liquidity, proxied by the current ratio, CURRAT, is significantly negative for all 4 specifications. This result is robust to the substitution of the quick ratio, QURAT, and leverage, LEVM. This suggests that firms with secured accounts receivable are more exposed to short-term default and pose a greater business risk of default. As shown in the model, since the amount of a secured L/C depends on customer risk rather than firm risk, borrowing against accounts receivable permits a firm to borrow greater amounts than would be permitted on an unsecured basis. We find an economic significance of the doubling of CURRAT is a 20% decrease in the likelihood of using a secured L/C loan.

Table 3 also shows that inventory turnover, INVENTURN, is significantly positive for all specifications. This indicates that firms with secured accounts receivable are more likely to have longer inventory turnover and benefit most from the flexible payment schedule of a L/C loan. This result suggests that secured borrowers are those firms whose financial ratios indicate too high a default risk to borrow on an unsecured basis. We find that the economic significance of doubling the inventory turnover is a 4% increase in the likelihood of using a secured L/C loan. We also find that accounts receivable turnover, ACCRECTURN, is insignificantly different for the two groups of borrowers (not shown). This is consistent with our prediction that receivable financing is attractive to borrowers that have a large amount of high-quality accounts receivable relative to borrowing needs. (In other words, although secured borrowers are characterized as higher risk, their accounts receivable are not distinguishably riskier).

Table 3, columns (1) and (2) show alternative measures of expected future growth. Two measures of market perceived future growth, market-to-book, MKTBK, and (pseudo) Tobin's-q, TOBINQ, (not show), and the firm's indicator of potential growth, R&D-to-sales, R&DSAL, are all significantly negative. These regressions strongly suggest that firms who use secured L/Cs are perceived as having lower future earnings and sales and a higher risk of future default. Furthermore, we find that a doubling of MKTBK and RDSAL results in a 5% and 8% decrease, respectively, of using a secured L/C loan.

Table 3, columns (3) and (4) include dummies identifying whether the borrower has alternative sources of credit. Column (3) finds that firms that pay dividends are significantly less likely to have secured debt outstanding. Consistent with the hypothesis that a secured L/C loan is an expensive loan "of last resort", this test finds that secured L/Cs are less likely to be used by firms that could raise internal capital by reducing dividend payments. Additionally, we find that the economic significance of eliminating dividend payments increases the likelihood of using a secured L/C loan by almost 80%.

Column (4) finds that firms that reduced dividend payments within the past 5 years are more likely to use a secured L/C loan. This suggests that dividend payments are reduced by credit constrained firms. We find the economic significance of not reducing dividend payments in the past 5 years decreases the likelihood of using a secured L/C loan by over 100%. We also find that a dummy indicating a bond rating is insignificantly different from zero, confirming our previous assertion that a secured L/C used for working capital purposes is not a substitute for long-term debt (not shown).

These empirical tests also include SIC dummies to correct for industry effects (not shown). Dummy variables are included for nine 2-digit SIC codes that identify industries that include at least 25 firms in our sample. The SIC dummies are statistically insignificant, except for SIC code 36, “Electronic and Other Electric Equipment”. This result is not surprising, since this industry is characterized by high levels of inventory turnover and sales.

5. Conclusion

The risk of an unsecured short-term loan is measured by the strength of the borrower’s balance sheet and financial statements and the borrower’s proven ability to generate new sales and repay the loan in the short-term. Whereas an unsecured loan is repaid from the borrower’s future cash flow, a loan secured by accounts receivable is repaid from *previously* generated and observed sales (the borrower’s trade credit terms to its customers). Therefore, lenders that secure accounts receivables are most concerned with the credit risk of the borrower’s customers and the ability of the borrower to continue to generate new accounts receivable.

Most extant literature on collateral focuses on the use of “outside” collateral, which are the personal assets of the borrower and which are not otherwise collectable by the lender in the case of default. This literature does not explain the nature and use of secured L/C loans, since accounts receivable are a unique form of “inside” collateral, which are assets that comprise the liquidation value of the firm and which shift the priority structure of the borrower’s assets in the case of default from the unsecured to secured lender(s). Our paper presents the first model to explicitly discuss conditions

under which inside collateral is an optimal feature for a debt contract to address the agency and moral hazard problems associated with short-term debt.

Our theoretical model motivates a secured L/C loan contract as a costly-monitoring mechanism for risky firms to address the moral hazard of diversion in the case of business default. We show that a secured L/C loan allows a lender to make larger loans than would be permissible on an unsecured basis, thus maximizing a risky borrower's investment capital. The model's predictions are supported by empirical evidence that secured L/Cs are used by borrowers characterized as being more informationally opaque and having observably higher risk. In addition, we find that firms that use secured L/C loans have less future growth opportunities and are less likely to pay dividends. Our results highlight the important role of secured L/Cs in providing liquidity to risky, credit-constrained firms that may not be able to access other venues of external financing.

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Table 1: Summary Statistics

Summary statistics are for a sample of 821 manufacturing firms in 1995.

Variable Name:	Definition:	Mean:
<i>Secured L/C Loan Dummy (Dependent Variable)</i>		
SECLC	= 1 if the firm has an outstanding L/C loan secured by accounts receivable, 0 otherwise	19.2%
<i>Size, Age, and Growth Variables:</i>		
ASSETS	= Total Assets (millions)	\$1,414.76
(Median)		(\$124.55)
SALES	= Total Sales (millions)	\$1,546.61
(Median)		(\$154.66)
EMPLOYMENT	= Total Employment (thousands)	7.34
(Median)		(1.07)
AGE	= Number of Years Traded	29.87
EMPLOYGR5	5 Year Employment Growth	6.01%
<i>Liquidity and Leverage Variables:</i>		
CURRAT	= Current Ratio, measured as the ratio of current assets to total liabilities	2.82
QUICKRAT	= Quick Ratio, measured as the ratio of current assets less inventory to total liabilities	1.92
LEVERAGE	= Leverage, measured as the ratio of total debt to the market value of assets (total liabilities plus the market value of equity)	0.54
<i>Turnover Variables:</i>		
INVENTURN	= Inventory Turnover, measured as the ratio of inventory to cost of goods sold	99.56
ACCRECTURN	= Accounts Receivable Turnover, measured as the ratio of accounts receivable to total sales	64.89
<i>Future Growth Variables:</i>		
MKTBK	= The ratio of the market value of equity as a percentage of the book value of equity	2.94
RDSAL	= The ratio of research and development expenses to total sales	0.06
TOBINQ	= (Pseudo) Tobin's-Q, measured as the ratio of the market value of assets (total liabilities plus the market value of equity) to the book value of assets	0.96
<i>Dummy Variables:</i>		
D-DIVPAY	= 1 if a firm pays dividends, 0 otherwise	44.12%
D-PREDIV	= 1 if a firm currently does not pay dividends, but previously paid out dividends within the past 5 years, 0 otherwise	8.85%
D-BNDRAT	= 1 if the firm has a bond rating, 0 otherwise	21.03%
<i>Bankruptcy Prediction Variable:</i>		
ALTMANZ	= <i>Altman Z-Score</i> : a weighted average of net working capital, retained earnings, interest earned, market-to-book, and sales. A higher Z-Score suggests a lower likelihood that the business will go bankrupt in the following year.	3.41

**Table 2: Univariate Tests of the Determinants of
the Use of Secured L/C Loans**

Summary statistics are for 1995. Variable names are defined in Table 1. Asterisks (***, **, *) denote statistical significance at the 1%, 5%, and 10% level, respectively, for a two-tailed Wilcoxon two-sample test (dummies are not tested). Asterisks are placed next to the value that is significantly larger.

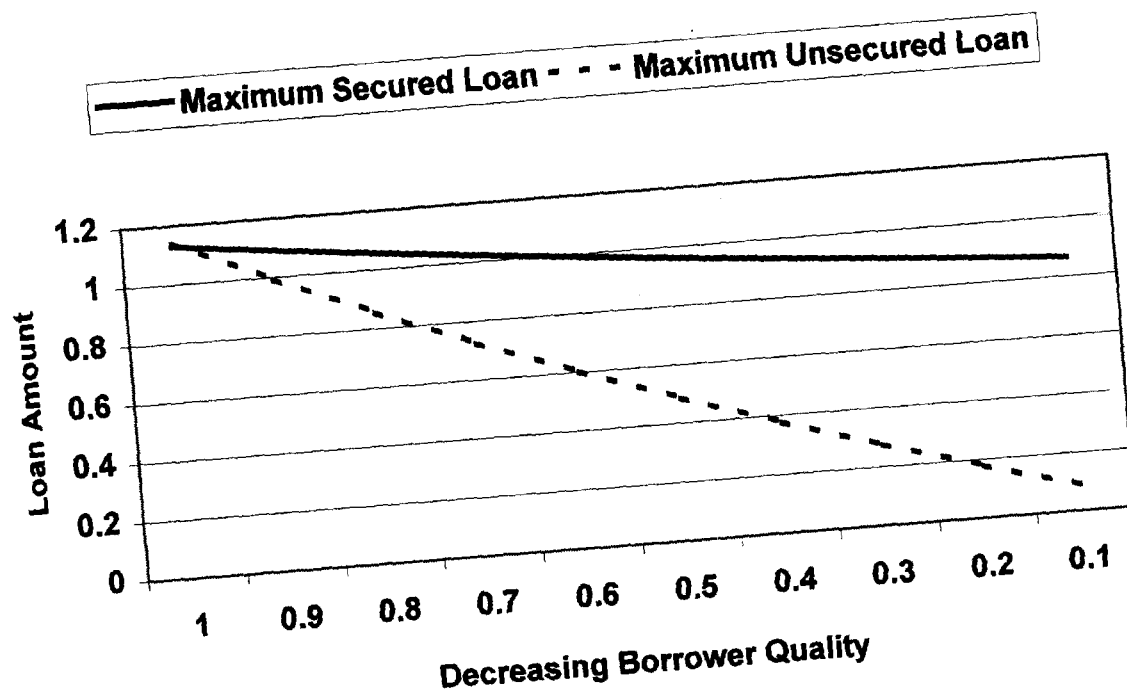
	(1)	(2)	(3)
	Full Sample	No Secured L/C Loans	Secured L/C Loans
Number of Observations	821	663	158
<i>Size, Age, and Growth Variables:</i>			
ASSETS	1414.76	1719.20***	137.26
(Median)	(124.55)	(174.22)	(53.00)
SALES	1546.61	1863.76***	215.77
(Median)	(154.66)	(209.32)	(68.48)
EMPLOYMENT	7.34	8.79***	1.31
(Median)	(1.07)	(1.34)	(0.53)
AGE	29.87	29.85	29.94*
EMPLOYGR5	0.06	0.06	0.09**
<i>Liquidity and Leverage Variables:</i>			
LEVERAGE	0.54	0.28	0.72***
CURRAT	2.82	2.93***	2.37
QUICKRAT	1.92	2.05***	1.39
<i>Turnover Variables:</i>			
ACCRECTURN	64.89	65.11	63.99
INVENTURN	99.56	96.16	113.70***
<i>Future Growth Variables:</i>			
MKTBK	2.94	3.02**	2.58
RDSAL	0.06	0.07*	0.05
TOBINQ	0.96	0.99***	0.80
<i>Dummy Variables:</i>			
D-DIVPAY	0.44	0.52	0.11
D-PREDIV	0.08	0.06	0.15
D-BNDRAT	0.21	0.24	0.10
<i>Bankruptcy Prediction Variable:</i>			
ALTMANZ	3.41	3.60***	2.76

Table 3: Logit Tests of the Determinants of the Use of Secured L/C Loans

Summary statistics are for 1995. Variable names are defined in Table 1. Statistical significance is indicated by the t-statistics in parenthesis. Regressions include 2-digit SIC codes, not shown. Asterisks (***, **, *) denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)		(2)		(3)		(4)	
<i>Independent Variables:</i>	Coef	t-Stat	Coef	t-Stat	Coef	t-Stat	Coef	t-Stat
Intercept	3.11	0.18	0.99***	2.66	0.74**	1.88	0.93**	2.37
Ln(ASSETS)	-0.41***	-7.47	-0.44***	-7.80	-0.22***	-3.41	-0.41***	-7.30
EMPLOYGR5	1.25**	2.45	1.22**	2.41	0.87*	1.72	1.46***	2.85
CURRAT	-0.39***	-5.40	-0.38***	-5.31	-0.35***	-4.84	-0.37***	-5.20
INVENTURN	0.01***	3.72	0.01***	4.04	0.00***	2.77	-0.09**	-2.22
MKTBK	-0.10**	-2.48			-0.10**	-2.45	0.01***	3.49
RDSAL			-2.61***	-2.88				
D-DIVPAY					-1.71***	-5.77		
D-PREDIV							0.99***	3.25
Percentage Concordant:	75.9%		77.0%		79.2%		72.6%	

Figure 1: Maximum Loan Amounts: Secured and Unsecured



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